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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,585	05/22/2002	John R. Riordan	07039-167002	5671

7590 09/02/2005

Fish & Richardson
60 South Sixth Street Suite 3300
Minneapolis, MN 55402

EXAMINER

MURPHY, JOSEPH F

ART UNIT	PAPER NUMBER
----------	--------------

1646

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/030,585

Applicant(s)

RIORDAN ET AL.

Examiner

Joseph F. Murphy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-53 is/are pending in the application.
- 4a) Of the above claim(s) 9-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 51-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03012004;01082002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Sequence Comparison A-D.

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DETAILED ACTION

Election/Restrictions

Claims 1-3, 5-53 are pending. Claims 9-50 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07/5/2005.

Claims 1-3, 5-8, 51-53 are under consideration.

Claim Rejections - 35 USC § 112 first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 7, 51-53 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are drawn to polypeptides comprising variant sequences, and polynucleotides encoding these polypeptides. Claims 1-2, 7, 51-52 are not enabled since insufficient guidance is provided as to the function of the myriad of polypeptides and encoding nucleic acids. In addition, the claims are drawn to isolated polypeptides with a defined sequence, however, no function is provided for the polypeptides. Applicants do not disclose any actual or prophetic examples on expected performance parameters of any of the possible variants of the polypeptides. It is known in the art that even single amino acid changes or differences in the amino acid sequence of a protein can have dramatic effects on the protein's function. As an

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example of the unpredictable effects of mutations on protein function, Mickle et al. teaches that cystic fibrosis is an autosomal recessive disorder caused by abnormal function of a chloride channel, referred to as the cystic fibrosis transmembrane conductance regulator (CFTR) (page 597). Several mutations can cause CF, including the G551D mutation. In this mutation a glycine replaces the aspartic acid at position 551, giving rise to the CF phenotype. In the most common CF mutation, delta-F508, a single phenylalanine is deleted at position 508, giving rise to the CF phenotype. Thus showing that even the substitution or deletion of a single amino acid in the entire 1480 amino acid CFTR protein sequence can have dramatic and unpredictable effects on the function of the protein. Additionally, it is known in the art that even a single amino acid change in a protein's sequence can drastically affect the structure of the protein and the architecture of an entire cell. For example, Voet et al. (1990) teaches that a single Glu to Val substitution in the beta subunit of hemoglobin causes the hemoglobin molecules to associate with one another in such a manner that, in homozygous individuals, erythrocytes are altered from their normal discoid shape and assume the sickle shape characteristic of sickle-cell anemia, causing hemolytic anemia and blood flow blockages (pages 126-128, section 6-3A and page 230, column 2, first paragraph). Additionally, Yan et al. teaches that in certain cases, a change of two-amino acid residues in a protein results in switching the binding of the protein from one receptor to another (Yan et al., Two-amino acid molecular switch in an epithelial morphogen that regulates binding to two distinct receptors. *Science* 290: 523-527, 2000). Since the claims encompass nucleic acids encoding variant polypeptides and given the art recognized unpredictability of the effect of mutations on protein function, it would require undue experimentation to make and use the claimed invention. See *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. The test of

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enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. The claims do not set forth a functional limitation for the encoding nucleic acids or variant polypeptides and since the amino acid sequence of a polypeptide determines its structural and functional properties, and the predictability of which amino acids can be substituted is extremely complex and outside the realm of routine experimentation, because accurate predictions of a polypeptide's structure from mere sequence data are limited. Since detailed information regarding the structural and functional requirements of the polynucleotide and the encoded polypeptide are lacking, it is unpredictable as to which variations, if any, meet the limitations of the claims. Applicant is required to enable one of skill in the art to make and use the claimed invention, while the claims encompass polynucleotides and encoded polypeptides for which no function is set forth.

In addition, claim 53 is not enabled because Applicants have provided no guidance or working examples of any methods of treatment for any diseases using these polypeptides, including any data or treatment regimen. Furthermore, it is not predictable to one of ordinary skill in the art how to use a pharmaceutical composition. Applicants can overcome this rejection by amending the claims to recite the proteins which are "in a pharmaceutically acceptable carrier."

Claim 5 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated CFTR polypeptide with a mutant arginine with an enhanced export, does not reasonably provide enablement for any other isolated polypeptide with a mutant arginine with an enhanced export function. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The claims are drawn to a polypeptide comprising a mutation in an R-X-R sequence, wherein the mutant has an enhanced export relative to the non-mutant form. Applicant has only provided examples using CFTR. Applicants do not disclose any actual or prophetic examples on expected performance parameters of any of the possible variants in polypeptides other than CFTR. It is known in the art that even single amino acid changes or differences in the amino acid sequence of a protein can have dramatic effects on the protein's function. As an example of the unpredictable effects of mutations on protein function, Mickle et al. teaches that cystic fibrosis is an autosomal recessive disorder caused by abnormal function of a chloride channel, referred to as the cystic fibrosis transmembrane conductance regulator (CFTR) (page 597). Several mutations can cause CF, including the G551D mutation. In this mutation a glycine replaces the aspartic acid at position 551, giving rise to the CF phenotype. In the most common CF mutation, delta-F508, a single phenylalanine is deleted at position 508, giving rise to the CF phenotype. Thus showing that even the substitution or deletion of a single amino acid in the entire 1480 amino acid CFTR protein sequence can have dramatic and unpredictable effects on the function of the protein. Additionally, it is known in the art that even a single amino acid change in a protein's sequence can drastically affect the structure of the protein and the

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architecture of an entire cell. For example, Voet et al. (1990) teaches that a single Glu to Val substitution in the beta subunit of hemoglobin causes the hemoglobin molecules to associate with one another in such a manner that, in homozygous individuals, erythrocytes are altered from their normal discoid shape and assume the sickle shape characteristic of sickle-cell anemia, causing hemolytic anemia and blood flow blockages (pages 126-128, section 6-3A and page 230, column 2, first paragraph). Additionally, Yan et al. teaches that in certain cases, a change of two-amino acid residues in a protein results in switching the binding of the protein from one receptor to another (Yan et al., Two-amino acid molecular switch in an epithelial morphogen that regulates binding to two distinct receptors. *Science* 290: 523-527, 2000). Since the claims encompass nucleic acids encoding variant polypeptides and given the art recognized unpredictability of the effect of mutations on protein function, it would require undue experimentation to make and use the claimed invention. See *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue, since the amino acid sequence of a polypeptide determines its structural and functional properties, and the predictability of which amino acids can be substituted is extremely complex and outside the realm of routine experimentation, because accurate predictions of a polypeptide's structure from mere sequence data are limited. Since detailed information regarding the structural and functional requirements of the polynucleotide and the encoded polypeptide are lacking, it is unpredictable as to which variations, if any, meet the limitations of the claims. Applicant is required to enable one of skill in the art to make and use the claimed invention, while the claims encompass polynucleotides and polypeptides that the specification only teaches one skilled in the art to test for functional variants. Since the claims

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do not enable one of skill in the art to make and use the claimed polypeptides, but only teaches how to screen for the claimed polypeptides, and since detailed information regarding the structural and functional requirements of the polynucleotide and the encoded polypeptide are lacking, it is unpredictable as to which variations, if any, meet the limitations of the claims.

Claims 1-2, 5-7, 51-52 are rejected, under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant is directed to the Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, Federal Register, Vol. 66, No. 4, pages 1099-1111, Friday January 5, 2001.

The claims are drawn to polypeptides comprising variant sequences, and polynucleotides encoding these polypeptides. Claims 1-2, 5-7, 51-52 are not described since insufficient guidance is provided as to the function of the myriad of polypeptides and encoding nucleic acids. In addition, the claims are drawn to isolated polypeptides with a defined sequence, however, no function is provided for the polypeptides. In addition, claims 5-6 are directed to a polypeptide comprising a mutation in an R-X-R sequence, wherein the mutant has an enhanced export relative to the non-mutant form. The specification and claims do not place any limit on the number of amino acid substitutions, deletions, insertions and/or additions that may be made to the encoded variants. Thus, the scope of the claim includes numerous structural variants, and the

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genus is highly variant because a significant number of structural differences between genus members is permitted. The specification and claim do not provide any guidance as to what changes should be made. Structural features that could distinguish compounds in the genus from others in the nucleic acid class are missing from the disclosure. No common structural attributes identify the members of the genus. The general knowledge and level of skill in the art do not supplement the omitted description because specific, not general, guidance is what is needed. Since the disclosure fails to describe the common attributes or characteristics that identify members of the genus, and because the genus is highly variant, the genus is insufficiently described. The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice, reduction to drawings, or by disclosure of relevant identifying characteristics, i.e. structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between structure and function structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus. In the instant case, the specification fails to provide sufficient descriptive information, such as definitive structural or functional features of the genus of polynucleotides. There is no description of the conserved regions which are critical to the structure and function of the genus claimed. There is no description of the sites at which variability may be tolerated and there is no information regarding the relation of structure to function. Furthermore, the prior art does not provide compensatory structural or correlative teachings sufficient to enable one of skill to isolate and identify the polynucleotides and polypeptides encompassed. Thus, no identifying characteristics or properties of the instant polypeptides are provided such that one of skill would

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be able to predictably identify the encompassed molecules as being identical to those instantly claimed. One of skill in the art would reasonably conclude that the disclosure fails to provide a representative number of species to describe the genus. Thus, applicant was not in possession of the claimed genus.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7, 51-52 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S.

Patent Number 5, 639,661 (Welsh et al.).

The claims are drawn to an isolated polypeptide comprising a polypeptide having the sequence X-R-X-R-X, and polynucleotides encoding them. Claims 1-3 are anticipated because the '661 patent discloses a polypeptide comprising the sequences of SEQ ID NO: 1-4 (See Sequence Comparisons A-D, attached). Claims 7, 51-52 are anticipated because the '661 patent discloses encoding polynucleotides (see Column 4, lines 25-30).

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,750,571 (Cheng et al.).

The claim is drawn to a method of identifying a therapeutic agent which increases the amount of export-incompetent CFTR which reaches the cell membrane. The claim is anticipated because the '571 patent discloses the treatment of cystic fibrosis-associated (CF-associated) cells

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with butyrate resulted in functional mutant cystic fibrosis transmembrane regulator (CFTR) protein within the CF-associated cells. The butyrate facilitated the delivery of the mutant CFTR to the appropriate location within the CF-associated cell (the plasma membrane) and the mutant CFTR of butyrate-treated cells was capable of generating chloride channels (column 2, lines 25-35).

References

The Office will no longer be supplying paper copies of U.S. Patents cited in Office Actions. Applicant is advised that the cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicant may direct inquiries about the use of the Office's PAIR system to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197.

Conclusion

Claims 1-3, 5, 7-8, 51-53 are rejected.

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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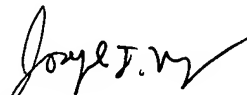
Advisory Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Murphy whose telephone number is (571) 272-0877. The examiner can normally be reached Monday through Friday from 7:30 am to 5:00 pm. A message may be left on the examiner's voice mail service. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Caputa, can be reached on (571) 272-0829.

The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joseph F. Murphy, Ph. D.
Primary Examiner
Art Unit 1646
August 29, 2005


JOSEPH MURPHY
PATENT EXAMINER

Sequence Comparison A
SEQ ID NO: 1

RESULT 1
US-08-216-971-2
; Sequence 2, Application US/08216971
; Patent No. 5639661
; GENERAL INFORMATION:
; APPLICANT: Welsh, Michael J.
; APPLICANT: Sheppard, David N.
; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING
; TITLE OF INVENTION: CYSTIC FIBROSIS
; NUMBER OF SEQUENCES: 2
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: LAHIVE & COCKFIELD
; STREET: 60 State Street, suite #510
; CITY: Boston
; STATE: Massachusetts
; COUNTRY: USA
; ZIP: 02109-1875
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/216,971
; FILING DATE: 23-MAR-1994
; CLASSIFICATION: 514
; ATTORNEY/AGENT INFORMATION:
; NAME: Arnold, Beth E.
; REGISTRATION NUMBER: 35,430
; REFERENCE/DOCKET NUMBER: UIZ-011
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (617) 227-7400
; TELEFAX: (617) 227-5941
; INFORMATION FOR SEQ ID NO: 2:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 836 amino acids
; TYPE: amino acid
; TOPOLOGY: linear
; MOLECULE TYPE: protein
US-08-216-971-2

Query Match 100.0%; Score 37; DB 1; Length 836;
Best Local Similarity 100.0%; Pred. No. 13;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GYRQRLE 7
|||
Db 27 GYRQRLE 33

Sequence Comparison B

SEQ ID NO: 2

RESULT 8
 US-08-216-971-2
 ; Sequence 2, Application US/08216971
 ; Patent No. 5639661
 ; GENERAL INFORMATION:
 ; APPLICANT: Welsh, Michael J.
 ; APPLICANT: Sheppard, David N.
 ; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING
 ; TITLE OF INVENTION: CYSTIC FIBROSIS
 ; NUMBER OF SEQUENCES: 2
 ; CORRESPONDENCE ADDRESS:
 ; ADDRESSEE: LAHIVE & COCKFIELD
 ; STREET: 60 State Street, suite #510
 ; CITY: Boston
 ; STATE: Massachusetts
 ; COUNTRY: USA
 ; ZIP: 02109-1875
 ; COMPUTER READABLE FORM:
 ; MEDIUM TYPE: Floppy disk
 ; COMPUTER: IBM PC compatible
 ; OPERATING SYSTEM: PC-DOS/MS-DOS
 ; SOFTWARE: PatentIn Release #1.0, Version #1.25
 ; CURRENT APPLICATION DATA:
 ; APPLICATION NUMBER: US/08/216,971
 ; FILING DATE: 23-MAR-1994
 ; CLASSIFICATION: 514
 ; ATTORNEY/AGENT INFORMATION:
 ; NAME: Arnold, Beth E.
 ; REGISTRATION NUMBER: 35,430
 ; REFERENCE/DOCKET NUMBER: UIZ-011
 ; TELECOMMUNICATION INFORMATION:
 ; TELEPHONE: (617) 227-7400
 ; TELEFAX: (617) 227-5941
 ; INFORMATION FOR SEQ ID NO: 2:
 ; SEQUENCE CHARACTERISTICS:
 ; LENGTH: 836 amino acids
 ; TYPE: amino acid
 ; TOPOLOGY: linear
 ; MOLECULE TYPE: protein
 US-08-216-971-2

Query Match 100.0%; Score 37; DB 1; Length 836;
 Best Local Similarity 100.0%; Pred. No. 11;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 EYRYRSV 7
 |||||
 Db 514 EYRYRSV 520

Sequence Comparison C
SEQ ID NO: 3

RESULT 7

US-08-216-971-2

; Sequence 2, Application US/08216971
; Patent No. 5639661
; GENERAL INFORMATION:
; APPLICANT: Welsh, Michael J.
; APPLICANT: Sheppard, David N.
; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING
; TITLE OF INVENTION: CYSTIC FIBROSIS
; NUMBER OF SEQUENCES: 2
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: LAHIVE & COCKFIELD
; STREET: 60 State Street, suite #510
; CITY: Boston
; STATE: Massachusetts
; COUNTRY: USA
; ZIP: 02109-1875
; COMPUTER READABLE FORM:
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; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/216,971
; FILING DATE: 23-MAR-1994
; CLASSIFICATION: 514
; ATTORNEY/AGENT INFORMATION:
; NAME: Arnold, Beth E.
; REGISTRATION NUMBER: 35,430
; REFERENCE/DOCKET NUMBER: UIZ-011
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (617) 227-7400
; TELEFAX: (617) 227-5941
; INFORMATION FOR SEQ ID NO: 2:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 836 amino acids
; TYPE: amino acid
; TOPOLOGY: linear
; MOLECULE TYPE: protein
US-08-216-971-2

Query Match 100.0%; Score 33; DB 1; Length 836;
Best Local Similarity 100.0%; Pred. No. 33;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GQRARIS 7
|||
Db 551 GQRARIS 557

Sequence Comparison D
SEQ ID NO: 4

RESULT 1

US-08-216-971-2

; Sequence 2, Application US/08216971

; Patent No. 5639661

; GENERAL INFORMATION:

; APPLICANT: Welsh, Michael J.

; APPLICANT: Sheppard, David N.

; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING

; TITLE OF INVENTION: CYSTIC FIBROSIS

; NUMBER OF SEQUENCES: 2

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: LAHIVE & COCKFIELD

; STREET: 60 State Street, suite #510

; CITY: Boston

; STATE: Massachusetts

; COUNTRY: USA

; ZIP: 02109-1875

; COMPUTER READABLE FORM:

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; APPLICATION NUMBER: US/08/216,971

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; CLASSIFICATION: 514

; ATTORNEY/AGENT INFORMATION:

; NAME: Arnold, Beth E.

; REGISTRATION NUMBER: 35,430

; REFERENCE/DOCKET NUMBER: UIZ-011

; TELECOMMUNICATION INFORMATION:

; TELEPHONE: (617) 227-7400

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; INFORMATION FOR SEQ ID NO: 2:

; SEQUENCE CHARACTERISTICS:

; LENGTH: 836 amino acids

; TYPE: amino acid

; TOPOLOGY: linear

; MOLECULE TYPE: protein

US-08-216-971-2

Query Match 100.0%; Score 33; DB 1; Length 836;

Best Local Similarity 100.0%; Pred. No. 67;

Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 QARRRQS 7

||||||

Db 762 QARRRQS 768

10030585 Results

SEQ ID NO: 1

10030585 Results:

SEQ ID NO: 1

SUMMARIES

Result No.	Query				ID	Description
	Score	Match	Length	DB		
1	37	100.0	7	4	AAB31715	Aab31715 Peptide w
2	37	100.0	25	4	AAB31719	Aab31719 Arginine-
3	37	100.0	151	2	AAR13304	Aar13304 CFTR 556
4	37	100.0	354	6	ABR83574	Abr83574 Human CFT
5	37	100.0	492	2	AAR13236	Aar13236 CFTR Q493
6	37	100.0	541	2	AAR13296	Aar13296 CFTR G542
7	37	100.0	836	2	AAR79835	Aar79835 Truncated
8	37	100.0	1091	2	AAR13303	Aar13303 CFTR Y109
9	37	100.0	1190	2	AAR13308	Aar13308 CFTR 3659
10	37	100.0	1248	8	ABO84493	Abo84493 Human can
11	37	100.0	1461	8	ADO28621	Ado28621 Human chl
12	37	100.0	1476	2	AAY33968	Aay33968 CFTR prot
13	37	100.0	1479	2	AAR13231	Aar13231 CFTR delt
14	37	100.0	1479	2	AAR11602	Aar11602 Mutant cy
15	37	100.0	1479	2	AAY02279	Aay02279 DeltaF508
16	37	100.0	1479	5	AAU74516	Aau74516 Human del
17	37	100.0	1479	7	ADA37387	Ada37387 Human CFT
18	37	100.0	1480	2	AAR13300	Aar13300 CFTR Y563
19	37	100.0	1480	2	AAR13232	Aar13232 CFTR G85E
20	37	100.0	1480	2	AAR13234	Aar13234 CFTR G178
21	37	100.0	1480	2	AAR13233	Aar13233 CFTR I148
22	37	100.0	1480	2	AAR13235	Aar13235 CFTR A455
23	37	100.0	1480	2	AAR13298	Aar13298 CFTR G551
24	37	100.0	1480	2	AAR13302	Aar13302 CFTR L107
25	37	100.0	1480	2	AAR13301	Aar13301 CFTR P574
26	37	100.0	1480	2	AAR13299	Aar13299 CFTR R560
27	37	100.0	1480	2	AAR13297	Aar13297 CFTR S549
28	37	100.0	1480	2	AAR11115	Aar11115 Cystic fi
29	37	100.0	1480	2	AAR13894	Aar13894 Cystic fi
30	37	100.0	1480	2	AAR22492	Aar22492 Cystic Fi
31	37	100.0	1480	2	AAW68012	Aaw68012 Human cys
32	37	100.0	1480	2	AAR23074	Aar23074 Cystic fi
33	37	100.0	1480	2	AAR79011	Aar79011 CFTR enco
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36	37	100.0	1480	2	AAR72384	Aar72384 Cystic fi
37	37	100.0	1480	2	AAY49869	Aay49869 Human cys
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RESULT 3

AAR13304

ID AAR13304 standard; protein; 151 AA.

XX

AC AAR13304;

XX

DT 14-OCT-1991 (first entry)

XX
 DE CFTR 556 del A.
 XX
 KW Deletion; mutant; diagnosis; antibodies; drug therapy.
 XX
 OS Homo sapiens.
 XX
 FH Key Location/Qualifiers
 FT Modified-site 50
 FT /label= phosphorylation_site
 FT /note= "by protein kinases C"
 FT Modified-site 63
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 FT /note= "by protein kinases C"
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 FT /label= membrane-spanning_domain
 FT Domain 118. .138
 FT /label= membrane-spanning_domain
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 PN W09110734-A.
 XX
 PD 25-JUL-1991.
 XX
 PF 12-JAN-1990; 90CA-02007699.
 XX
 PR 12-JAN-1990; 90CA-02007699.
 PR 01-MAR-1990; 90CA-02011253.
 PR 10-JUL-1990; 90CA-02020817.
 XX
 PA (HSCR-) HSC RES DEV CORP.
 XX
 PI Tsui LC, Rommens JM, Kerem B;
 XX
 DR WPI; 1991-238022/32.
 DR N-PSDB; AAQ13068.
 XX
 PT Mutant cystic fibrosis trans-membrane conductance regulator gene - used
 PT for producing prods. for diagnosis, screening and therapy of cystic
 PT fibrosis.
 XX
 PS Claim 20; Page 124; 178pp; English.
 XX
 CC 556 del A is a frameshift mutation in exon 4 and results in shortened
 CC polypeptides significantly different from the single amino acid deletions
 CC or alterations. The mutant CF gene when expressed in cells of the human
 CC body, is associated with altered cell function which correlates with the
 CC genetic disease cystic fibrosis. See also AAQ13053-72
 XX
 SQ Sequence 151 AA;

Query Match 100.0%; Score 37; DB 2; Length 151;
 Best Local Similarity 100.0%; Pred. No. 10;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 GYRQRLE 7
 |||||
 Db 27 GYRQRLE 33

RESULT 5
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 ID AAR13236 standard; protein; 492 AA.
 XX
 AC AAR13236;
 XX
 DT 14-OCT-1991 (first entry)
 XX
 DE CFTR Q493X.
 XX
 KW Deletion; mutant; diagnosis; antibodies; drug therapy.
 XX

OS Homo sapiens.
 XX
 FH Key Location/Qualifiers
 FT Modified-site 50
 FT /label= phosphorylation_site
 FT /note= "by protein kinases C"
 FT Modified-site 63
 FT /label= phosphorylation_site
 FT /note= "by protein kinases C"
 FT Domain 81. .102
 FT /label= membrane-spanning_domain
 FT Domain 118. .138
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 FT Domain 308. .328
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 FT Domain 330. .350
 FT /label= membrane-spanning_domain
 FT Modified-site 422
 FT /label= phosphorylation_site
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 PN W09110734-A.
 XX
 PD 25-JUL-1991.
 XX
 PF 12-JAN-1990; 90CA-02007699.
 XX
 PR 12-JAN-1990; 90CA-02007699.
 PR 01-MAR-1990; 90CA-02011253.
 PR 10-JUL-1990; 90CA-02020817.
 XX
 PA (HSCR-) HSC RES DEV CORP.
 XX
 PI Tsui LC, Rommens JM, Kerem B;
 XX
 DR WPI; 1991-238022/32.
 DR N-PSDB; AAQ13058.
 XX
 PT Mutant cystic fibrosis trans-membrane conductance regulator gene - used
 PT for producing prods. for diagnosis, screening and therapy of cystic
 PT fibrosis.
 XX
 PS Claim 20; Page 124; 178pp; English.
 XX
 CC In the Q493X mutation Gln (CAG) is changed into a stop codon, resulting
 CC in a shortened polypeptide significantly different from the single amino
 CC acid deletions or alterations. The mutant CF gene when expressed in cells

CC of the human body, is associated with altered cell function which
CC correlates with the genetic disease cystic fibrosis. See also AAQ13053-72
XX
SQ Sequence 492 AA;

Query Match 100.0%; Score 37; DB 2; Length 492;
Best Local Similarity 100.0%; Pred. No. 34;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GYRQRLE 7
|||||||
Db 27 GYRQRLE 33

RESULT 7

AAR79835

ID AAR79835 standard; protein; 836 AA.

XX

AC AAR79835;

XX

DT 25-MAR-2003 (revised)

DT 02-MAY-1996 (first entry)

XX

DE Truncated cystic fibrosis transmembrane conductance regulator.

XX

KW Cystic fibrosis; transmembrane conductance; N-terminal; soluble;

KW truncated; chloride ion channel; gene therapy; CFTR; regulator;

KW epithelial cells; anion; recombinant production.

XX

OS Homo sapiens.

XX

PN W09525796-A1.

XX

PD 28-SEP-1995.

XX

PF 23-MAR-1995; 95WO-US003680.

XX

PR 23-MAR-1994; 94US-00216971.

XX

PA (IOWA) UNIV IOWA STATE RES FOUND INC.

XX

PI Welsh MJ, Sheppard DM;

XX

DR WPI; 1995-344617/44.

DR N-PSDB; AAT04005.

XX

PT New truncated CFTR polypeptide - functions as a regulated epithelial cell

PT anion channel, used for treating cystic fibrosis.

XX

PS Claim 17; Page 70-73; 85pp; English.

XX

CC AAT04005 encodes AAR79835 a truncated N-terminal portion of the cystic
CC fibrosis transmembrane conductance regulator (CFTR), which can be used to
CC regulate the opening and closing of epithelial cell anion (chloride ion)
CC channels. The truncated cDNA is useful in CF gene therapy, as it is more
CC readily accommodated by available gene therapy vectors, and more easily
CC expressed than full length CFTR. The expressed truncated CFTR protein may
CC be more soluble and therefore more readily purified from host cells,
CC useful in the recombinant prodn. of CFTR. (Updated on 25-MAR-2003 to
CC correct PI field.)

XX

SQ Sequence 836 AA;

Query Match 100.0%; Score 37; DB 2; Length 836;
Best Local Similarity 100.0%; Pred. No. 60;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GYRQRLE 7
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Db 27 GYRQRLE 33

SUMMARIES

Result No.	Score	% Query Match	Length	DB	ID	Description
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2	37	100.0	836	2	US-08-812-979-2	Sequence 2, Appli
3	37	100.0	1476	3	US-09-256-703-2	Sequence 2, Appli
4	37	100.0	1479	2	US-08-951-912-4	Sequence 4, Appli
5	37	100.0	1479	3	US-09-174-077-4	Sequence 4, Appli
6	37	100.0	1480	1	US-07-637-621-2	Sequence 2, Appli
7	37	100.0	1480	1	US-08-136-742A-2	Sequence 2, Appli
8	37	100.0	1480	1	US-08-135-809A-2	Sequence 2, Appli
9	37	100.0	1480	1	US-08-466-886-17	Sequence 17, Appl
10	37	100.0	1480	2	US-08-951-912-2	Sequence 2, Appli
11	37	100.0	1480	2	US-08-951-912-6	Sequence 6, Appli
12	37	100.0	1480	2	US-08-469-461-2	Sequence 2, Appli
13	37	100.0	1480	2	US-08-469-461-4	Sequence 4, Appli
14	37	100.0	1480	2	US-08-691-605-2	Sequence 2, Appli
15	37	100.0	1480	2	US-08-455-552A-14	Sequence 14, Appl
16	37	100.0	1480	3	US-07-890-609-2	Sequence 2, Appli
17	37	100.0	1480	3	US-07-890-609-4	Sequence 4, Appli
18	37	100.0	1480	3	US-09-248-026-2	Sequence 2, Appli
19	37	100.0	1480	3	US-08-469-617-17	Sequence 17, Appl
20	37	100.0	1480	3	US-08-681-838A-2	Sequence 2, Appli
21	37	100.0	1480	3	US-08-681-838A-3	Sequence 3, Appli
22	37	100.0	1480	3	US-09-174-077-2	Sequence 2, Appli
23	37	100.0	1480	3	US-09-174-077-6	Sequence 6, Appli
24	37	100.0	1480	4	US-09-425-453A-2	Sequence 2, Appli
25	37	100.0	1480	4	US-09-425-453A-4	Sequence 4, Appli
26	37	100.0	1480	4	US-09-425-453A-6	Sequence 6, Appli
27	37	100.0	1480	4	US-09-425-453A-8	Sequence 8, Appli
28	37	100.0	1480	4	US-09-425-453A-10	Sequence 10, Appl
29	37	100.0	1480	4	US-09-425-453A-12	Sequence 12, Appl
30	37	100.0	1480	4	US-09-425-453A-14	Sequence 14, Appl
31	37	100.0	1480	4	US-09-425-453A-16	Sequence 16, Appl
32	37	100.0	1480	4	US-09-425-453A-18	Sequence 18, Appl
33	37	100.0	1480	4	US-09-425-453A-20	Sequence 20, Appl
34	37	100.0	1480	4	US-08-469-630-17	Sequence 17, Appl
35	37	100.0	1480	4	US-09-949-016-5949	Sequence 5949, Ap
36	37	100.0	1480	4	US-09-405-735-2	Sequence 2, Appli
37	37	100.0	1480	5	PCT-US93-11667-2	Sequence 2, Appli
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39	37	100.0	1480	6	5240846-5	Patent No. 5240846
40	37	100.0	1501	4	US-09-949-016-11311	Sequence 11311, A

RESULT 1

US-08-216-971-2

; Sequence 2, Application US/08216971

; Patent No. 5639661

; GENERAL INFORMATION:

; APPLICANT: Welsh, Michael J.

; APPLICANT: Sheppard, David N.

; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING

; TITLE OF INVENTION: CYSTIC FIBROSIS

; NUMBER OF SEQUENCES: 2

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: LAHIVE & COCKFIELD

; STREET: 60 State Street, suite #510

; CITY: Boston

; STATE: Massachusetts

; COUNTRY: USA

; ZIP: 02109-1875

; COMPUTER READABLE FORM:

; MEDIUM TYPE: Floppy disk

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;   COMPUTER:  IBM PC compatible
;   OPERATING SYSTEM:  PC-DOS/MS-DOS
;   SOFTWARE:  PatentIn Release #1.0, Version #1.25
;   CURRENT APPLICATION DATA:
;   APPLICATION NUMBER:  US/08/216,971
;   FILING DATE:  23-MAR-1994
;   CLASSIFICATION:  514
;   ATTORNEY/AGENT INFORMATION:
;   NAME:  Arnold, Beth E.
;   REGISTRATION NUMBER:  35,430
;   REFERENCE/DOCKET NUMBER:  UIZ-011
;   TELECOMMUNICATION INFORMATION:
;   TELEPHONE:  (617) 227-7400
;   TELEFAX:  (617) 227-5941
;   INFORMATION FOR SEQ ID NO:  2:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH:  836 amino acids
;   TYPE:  amino acid
;   TOPOLOGY:  linear
;   MOLECULE TYPE:  protein
US-08-216-971-2

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Query Match      100.0%;  Score 37;  DB 1;  Length 836;
Best Local Similarity  100.0%;  Pred. No. 13;
Matches      7;  Conservative      0;  Mismatches      0;  Indels      0;  Gaps      0;

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Qy      1 GYRQRL 7
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Db      27 GYRQRL 33

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RESULT 6

US-07-637-621-2

; Sequence 2, Application US/07637621

; Patent No. 5407796

; GENERAL INFORMATION:

; APPLICANT: cutting, gary

; APPLICANT: antonarakis, stylianos e

; APPLICANT: kazazian jr., haig h

; TITLE OF INVENTION: CYSTIC FIBROSIS MUTATION CLUSTER

; NUMBER OF SEQUENCES: 4

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: Banner, Birch, McKie and Beckett

; STREET: 1001 G Street, N.W.

; CITY: Washington, D.C.

; COUNTRY: USA

; ZIP: 20001

; COMPUTER READABLE FORM:

; MEDIUM TYPE: Floppy disk

; COMPUTER: IBM PC compatible

; OPERATING SYSTEM: PC-DOS/MS-DOS

; SOFTWARE: PatentIn Release #1.0, Version #1.25

; CURRENT APPLICATION DATA:

; APPLICATION NUMBER: US/07/637,621

; FILING DATE: 19910104

; CLASSIFICATION: 435

; ATTORNEY/AGENT INFORMATION:

; NAME: kagan, sarah a

; REGISTRATION NUMBER: 32,141

; REFERENCE/DOCKET NUMBER: 1107.030010

; TELECOMMUNICATION INFORMATION:

; TELEPHONE: 202-508-9100

; TELEFAX: 202-508-9100

; INFORMATION FOR SEQ ID NO: 2:

; SEQUENCE CHARACTERISTICS:

; LENGTH: 1480 amino acids

; TYPE: AMINO ACID

; TOPOLOGY: linear

; MOLECULE TYPE: protein

; ORIGINAL SOURCE:

; ORGANISM: HOMO SAPIENS

US-07-637-621-2

Query Match 100.0%; Score 37; DB 1; Length 1480;
Best Local Similarity 100.0%; Pred. No. 25;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GYRQRLE 7
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Db 27 GYRQRLE 33

SEQ ID NO: 2

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5	37	100.0	31	2	AAR97848	Aar97848	Cystic fi
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10	37	100.0	60	4	AAM60363	Aam60363	Human bra
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12	37	100.0	60	5	ABG42838	Abg42838	Human pep
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14	37	100.0	191	6	ABR83571	Abr83571	Human CFT
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18	37	100.0	612	6	ABU37543	Abu37543	Protein e
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24	37	100.0	1279	2	AAR60872	Aar60872	STE6-CFTR
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27	37	100.0	1479	2	AAR13231	Aar13231	CFTR delt
28	37	100.0	1479	2	AAR11602	Aar11602	Mutant cy
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35	37	100.0	1480	2	AAR13233	Aar13233	CFTR I148
36	37	100.0	1480	2	AAR13235	Aar13235	CFTR A455
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42	37	100.0	1480	2	AAR11115	Aar11115	Cystic fi
43	37	100.0	1480	2	AAR13894	Aar13894	Cystic fi
44	37	100.0	1480	2	AAR22492	Aar22492	Cystic Fi
45	37	100.0	1480	2	AAW68012	Aaw68012	Human cys

RESULT 5

AAR97848

ID AAR97848 standard; protein; 31 AA.

XX

AC AAR97848;

XX

DT 07-NOV-1996 (first entry)

XX

DE Cystic fibrosis transmembrane regulator polypeptide.

XX

KW Cystic fibrosis; cystic fibrosis transmembrane regulator; CFTR;
KW identification; screening; chloride; chlorine; conductance channel;
KW pulmonary disease.

XX

OS Synthetic.

XX

PN WO9616084-A2.

XX

PD 30-MAY-1996.

XX

PF 06-NOV-1995; 95WO-US014345.

XX

PR 22-NOV-1994; 94US-00343714.

XX

PA (USSH) US DEPT HEALTH & HUMAN SERVICES.

XX

PI Pollard HB, Jacobson KA;

XX

DR WPI; 1996-268533/27.

DR N-PSDB; AAT30713.

XX

PT New CFTR polypeptide(s) - used for identifying CFTR-binding cpds. partic.
PT novel xanthine derivs., which can be used to treat cystic fibrosis.

XX

PS Claim 1; Page 44; 61pp; English.

XX

CC This polypeptide comprises a portion of the cystic fibrosis transmembrane
CC regulator (CFTR) protein and may be used to identify CFTR binding
CC compounds and compounds that can activate an impaired chlorine
CC conductance channel in cells having a reduced apical chlorine
CC conductance, such as cystic fibrosis. The compounds identified can also
CC be used for treating other chronic obstructive pulmonary diseases. The
CC polypeptide spans amino acids 509-539 of the CFTR protein

XX

SQ Sequence 31 AA;

Query Match 100.0%; Score 37; DB 2; Length 31;

Best Local Similarity 100.0%; Pred. No. 1.8;

Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Db 6 EYRYSV 12

RESULT 6

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ID AAR97849 standard; protein; 32 AA.

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AC AAR97849;

XX

DT 07-NOV-1996 (first entry)

XX

DE Cystic fibrosis transmembrane regulator polypeptide.

XX

KW Cystic fibrosis; cystic fibrosis transmembrane regulator; CFTR;
KW identification; screening; chloride; chlorine; conductance channel;
KW pulmonary disease.

XX

OS Synthetic.

XX

PN WO9616084-A2.
 XX
 PD 30-MAY-1996.
 XX
 PF 06-NOV-1995; 95WO-US014345.
 XX
 PR 22-NOV-1994; 94US-00343714.
 XX
 PA (USSH) US DEPT HEALTH & HUMAN SERVICES.
 XX
 PI Pollard HB, Jacobson KA;
 XX
 DR WPI; 1996-268533/27.
 DR N-PSDB; AAT30714.
 XX
 PT New CFTR polypeptide(s) - used for identifying CFTR-binding cpds. partic.
 PT novel xanthine derivs., which can be used to treat cystic fibrosis.
 XX
 PS Claim 1; Page 44; 61pp; English.
 XX
 CC This polypeptide comprises a portion of the cystic fibrosis transmembrane
 CC regulator (CFTR) protein and may be used to identify CFTR binding
 CC compounds and compounds that can activate an impaired chlorine
 CC conductance channel in cells having a reduced apical chlorine
 CC conductance, such as cystic fibrosis. The compounds identified can also
 CC be used for treating other chronic obstructive pulmonary diseases. The
 CC polypeptide spans amino acids 500-530 of the CFTR protein
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 SQ Sequence 32 AA;

Query Match 100.0%; Score 37; DB 2; Length 32;
 Best Local Similarity 100.0%; Pred. No. 1.9;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 EYRYSV 7
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 Db 15 EYRYSV 21

RESULT 15

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ID AAR13296 standard; protein; 541 AA.
 XX
 AC AAR13296;
 XX
 DT 14-OCT-1991 (first entry)
 XX
 DE CFTR G542X.
 XX
 KW Deletion; mutant; diagnosis; antibodies; drug therapy.
 XX
 OS Homo sapiens.
 XX
 FH Key Location/Qualifiers
 FT Modified-site 50
 FT /label= phosphorylation_site
 FT /note= "by protein kinases C"
 FT Modified-site 63
 FT /label= phosphorylation_site
 FT /note= "by protein kinases C"
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 FT /label= membrane-spanning_domain
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FT   /note= "by protein kinases C"
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PN   WO9110734-A.
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PD   25-JUL-1991.
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PF   12-JAN-1990;    90CA-02007699.
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PR   12-JAN-1990;    90CA-02007699.
PR   01-MAR-1990;    90CA-02011253.
PR   10-JUL-1990;    90CA-02020817.
XX
PA   (HSCR-) HSC RES DEV CORP.
XX
PI   Tsui LC,  Rommens JM,  Kerem B;
XX
DR   WPI; 1991-238022/32.
DR   N-PSDB; AAQ13059.
XX
PT   Mutant cystic fibrosis trans-membrane conductance regulator gene - used
PT   for producing prods. for diagnosis, screening and therapy of cystic
PT   fibrosis.
XX
PS   Claim 20; Page 124; 178pp; English.
XX
CC   In the G542X mutation Gly (GGA) is changed into a stop codon, resulting
CC   in a shortened polypeptide significantly different from the single amino
CC   acid deletions or alterations. The mutant CF gene when expressed in cells
CC   of the human body, is associated with altered cell function which
CC   correlates with the genetic disease cystic fibrosis. See also AAQ13053-72
XX
SQ   Sequence 541 AA;

Query Match      100.0%;  Score 37;  DB 2;  Length 541;
Best Local Similarity 100.0%;  Pred. No. 36;
Matches      7;  Conservative      0;  Mismatches      0;  Indels      0;  Gaps      0;

Qy      1 EYRYSV 7
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Db      514 EYRYSV 520

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SUMMARIES

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1	37	100.0	31	2	US-08-343-714-3	Sequence 3, Appli
2	37	100.0	31	3	US-09-114-537-3	Sequence 3, Appli
3	37	100.0	32	2	US-08-343-714-4	Sequence 4, Appli
4	37	100.0	32	3	US-09-114-537-4	Sequence 4, Appli
5	37	100.0	150	4	US-09-647-140B-25	Sequence 25, Appl
6	37	100.0	309	1	US-08-463-092B-8	Sequence 8, Appli
7	37	100.0	309	2	US-08-460-907B-8	Sequence 8, Appli
8	37	100.0	836	1	US-08-216-971-2	Sequence 2, Appli
9	37	100.0	836	2	US-08-812-979-2	Sequence 2, Appli
10	37	100.0	1476	3	US-09-256-703-2	Sequence 2, Appli
11	37	100.0	1479	2	US-08-951-912-4	Sequence 4, Appli
12	37	100.0	1479	3	US-09-174-077-4	Sequence 4, Appli
13	37	100.0	1480	1	US-07-637-621-2	Sequence 2, Appli
14	37	100.0	1480	1	US-08-136-742A-2	Sequence 2, Appli
15	37	100.0	1480	1	US-08-135-809A-2	Sequence 2, Appli
16	37	100.0	1480	1	US-08-466-886-17	Sequence 17, Appl
17	37	100.0	1480	2	US-08-951-912-2	Sequence 2, Appli
18	37	100.0	1480	2	US-08-951-912-6	Sequence 6, Appli
19	37	100.0	1480	2	US-08-469-461-2	Sequence 2, Appli
20	37	100.0	1480	2	US-08-469-461-4	Sequence 4, Appli
21	37	100.0	1480	2	US-08-691-605-2	Sequence 2, Appli
22	37	100.0	1480	2	US-08-455-552A-14	Sequence 14, Appl
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33	37	100.0	1480	4	US-09-425-453A-6	Sequence 6, Appli
34	37	100.0	1480	4	US-09-425-453A-8	Sequence 8, Appli
35	37	100.0	1480	4	US-09-425-453A-10	Sequence 10, Appl
36	37	100.0	1480	4	US-09-425-453A-12	Sequence 12, Appl
37	37	100.0	1480	4	US-09-425-453A-14	Sequence 14, Appl
38	37	100.0	1480	4	US-09-425-453A-16	Sequence 16, Appl
39	37	100.0	1480	4	US-09-425-453A-18	Sequence 18, Appl
40	37	100.0	1480	4	US-09-425-453A-20	Sequence 20, Appl
41	37	100.0	1480	4	US-08-469-630-17	Sequence 17, Appl
42	37	100.0	1480	4	US-09-949-016-5949	Sequence 5949, Ap
43	37	100.0	1480	4	US-09-405-735-2	Sequence 2, Appli
44	37	100.0	1480	5	PCT-US93-11667-2	Sequence 2, Appli
45	37	100.0	1480	6	5240846-5	Patent No. 5240846

RESULT 8

US-08-216-971-2

; Sequence 2, Application US/08216971

; Patent No. 5639661

; GENERAL INFORMATION:

; APPLICANT: Welsh, Michael J.

; APPLICANT: Sheppard, David N.

; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING

; TITLE OF INVENTION: CYSTIC FIBROSIS

; NUMBER OF SEQUENCES: 2

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: LAHIVE & COCKFIELD

; STREET: 60 State Street, suite #510

; CITY: Boston

; STATE: Massachusetts

; COUNTRY: USA

; ZIP: 02109-1875

; COMPUTER READABLE FORM:

; MEDIUM TYPE: Floppy disk

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;   COMPUTER:  IBM PC compatible
;   OPERATING SYSTEM:  PC-DOS/MS-DOS
;   SOFTWARE:  PatentIn Release #1.0, Version #1.25
;   CURRENT APPLICATION DATA:
;   APPLICATION NUMBER:  US/08/216,971
;   FILING DATE:  23-MAR-1994
;   CLASSIFICATION:  514
;   ATTORNEY/AGENT INFORMATION:
;   NAME:  Arnold, Beth E.
;   REGISTRATION NUMBER:  35,430
;   REFERENCE/DOCKET NUMBER:  UIZ-011
;   TELECOMMUNICATION INFORMATION:
;   TELEPHONE:  (617) 227-7400
;   TELEFAX:  (617) 227-5941
;   INFORMATION FOR SEQ ID NO:  2:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH:  836 amino acids
;   TYPE:  amino acid
;   TOPOLOGY:  linear
;   MOLECULE TYPE:  protein
US-08-216-971-2

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Query Match          100.0%;  Score 37;  DB 1;  Length 836;
Best Local Similarity 100.0%;  Pred. No. 11;
Matches      7;  Conservative    0;  Mismatches    0;  Indels      0;  Gaps      0;

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Qy      1 EYRYSV 7
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Db      514 EYRYSV 520

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RESULT 9

US-08-812-979-2

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; Sequence 2, Application US/08812979
; Patent No. 5958893
; GENERAL INFORMATION:
;   APPLICANT:  Welsh, Michael J.
;   APPLICANT:  Sheppard, David N.
;   TITLE OF INVENTION:  NOVEL GENES AND PROTEINS FOR TREATING
;   TITLE OF INVENTION:  CYSTIC FIBROSIS
;   NUMBER OF SEQUENCES:  2
;   CORRESPONDENCE ADDRESS:
;   ADDRESSEE:  LAHIVE & COCKFIELD
;   STREET:  60 State Street, suite #510
;   CITY:  Boston
;   STATE:  Massachusetts
;   COUNTRY:  USA
;   ZIP:  02109-1875
;   COMPUTER READABLE FORM:
;   MEDIUM TYPE:  Floppy disk
;   COMPUTER:  IBM PC compatible
;   OPERATING SYSTEM:  PC-DOS/MS-DOS
;   SOFTWARE:  PatentIn Release #1.0, Version #1.25
;   CURRENT APPLICATION DATA:
;   APPLICATION NUMBER:  US/08/812,979
;   FILING DATE:
;   CLASSIFICATION:
;   PRIOR APPLICATION DATA:
;   APPLICATION NUMBER:  08/216,971
;   FILING DATE:
;   ATTORNEY/AGENT INFORMATION:
;   NAME:  Arnold, Beth E.
;   REGISTRATION NUMBER:  35,430
;   REFERENCE/DOCKET NUMBER:  UIZ-011
;   TELECOMMUNICATION INFORMATION:
;   TELEPHONE:  (617) 227-7400
;   TELEFAX:  (617) 227-5941
;   INFORMATION FOR SEQ ID NO:  2:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH:  836 amino acids
;   TYPE:  amino acid

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; TOPOLOGY: linear
 ; MOLECULE TYPE: protein
 US-08-812-979-2

Query Match 100.0%; Score 37; DB 2; Length 836;
 Best Local Similarity 100.0%; Pred. No. 11;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 EYRYSV 7
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 Db 514 EYRYSV 520

SEQ ID NO: 3

SUMMARIES

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4	33	100.0	524	7	ADD48717	Add48717 Rat Prote
5	33	100.0	836	2	AAR79835	Aar79835 Truncated
6	33	100.0	1014	4	ABB58170	Abb58170 Drosophil
7	33	100.0	1091	2	AAR13303	Aar13303 CFTR Y109
8	33	100.0	1190	2	AAR13308	Aar13308 CFTR 3659
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17	33	100.0	1479	2	AAR11602	Aar11602 Mutant cy
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22	33	100.0	1480	2	AAR13232	Aar13232 CFTR G85E
23	33	100.0	1480	2	AAR13234	Aar13234 CFTR G178
24	33	100.0	1480	2	AAR13233	Aar13233 CFTR I148
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26	33	100.0	1480	2	AAR13302	Aar13302 CFTR L107
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38	33	100.0	1480	2	AAR72384	Aar72384 Cystic fi
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RESULT 5

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ID AAR79835 standard; protein; 836 AA.

XX

AC AAR79835;

XX

DT 25-MAR-2003 (revised)

DT 02-MAY-1996 (first entry)

XX

DE Truncated cystic fibrosis transmembrane conductance regulator.

XX

KW Cystic fibrosis; transmembrane conductance; N-terminal; soluble;
KW truncated; chloride ion channel; gene therapy; CFTR; regulator;
KW epithelial cells; anion; recombinant production.

XX

OS Homo sapiens.

XX

PN W09525796-A1.

XX

PD 28-SEP-1995.

XX

PF 23-MAR-1995; 95WO-US003680.

XX

PR 23-MAR-1994; 94US-00216971.

XX

PA (IOWA) UNIV IOWA STATE RES FOUND INC.

XX

PI Welsh MJ, Sheppard DM;

XX

DR WPI; 1995-344617/44.

DR N-PSDB; AAT04005.

XX

PT New truncated CFTR polypeptide - functions as a regulated epithelial cell
PT anion channel, used for treating cystic fibrosis.

XX

PS Claim 17; Page 70-73; 85pp; English.

XX

CC AAT04005 encodes AAR79835 a truncated N-terminal portion of the cystic
CC fibrosis transmembrane conductance regulator (CFTR), which can be used to
CC regulate the opening and closing of epithelial cell anion (chloride ion)
CC channels. The truncated cDNA is useful in CF gene therapy, as it is more
CC readily accommodated by available gene therapy vectors, and more easily
CC expressed than full length CFTR. The expressed truncated CFTR protein may
CC be more soluble and therefore more readily purified from host cells,
CC useful in the recombinant prodn. of CFTR. (Updated on 25-MAR-2003 to
CC correct PI field.)

XX

SQ Sequence 836 AA;

Query Match 100.0%; Score 33; DB 2; Length 836;

Best Local Similarity 100.0%; Pred. No. 1.6e+02;

Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GQRARIS 7

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Db 551 GQRARIS 557

RESULT 7

AAR13303

ID AAR13303 standard; protein; 1091 AA.

XX

AC AAR13303;

XX

DT 14-OCT-1991 (first entry)

XX

DE CFTR Y1092X.

XX

KW Deletion; mutant; diagnosis; antibodies; drug therapy.

XX

OS Homo sapiens.

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 PD 25-JUL-1991.
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 PF 12-JAN-1990; 90CA-02007699.
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 PR 12-JAN-1990; 90CA-02007699.
 PR 01-MAR-1990; 90CA-02011253.
 PR 10-JUL-1990; 90CA-02020817.
 XX
 PA (HSCR-) HSC RES DEV CORP.
 XX
 PI Tsui LC, Rommens JM, Kerem B;
 XX
 DR WPI; 1991-238022/32.
 DR N-PSDB; AAQ13066.
 XX
 PT Mutant cystic fibrosis trans-membrane conductance regulator gene - used
 PT for producing prods. for diagnosis, screening and therapy of cystic
 PT fibrosis.
 XX
 PS Claim 20; Page 124; 178pp; English.
 XX
 CC In the LY1092X mutation a C to A change is detected at nucleotide
 CC position 3408. This would result in protein synthesis termination at
 CC amino position 1092. Hence the amino acid Tyr is not present in the
 CC truncated polypeptide. The mutant CF gene when expressed in cells of the
 CC human body, is associated with altered cell function which correlates
 CC with the genetic disease cystic fibrosis. See also AAQ13053-72
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 SQ Sequence 1091 AA;

 Query Match 100.0%; Score 33; DB 2; Length 1091;
 Best Local Similarity 100.0%; Pred. No. 2.1e+02;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

 Qy 1 GQRARIS 7
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 Db 551 GQRARIS 557

RESULT 8
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 DT 14-OCT-1991 (first entry)
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 KW Deletion; mutant; diagnosis; antibodies; drug therapy.
 XX
 OS Homo sapiens.
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 PD 25-JUL-1991.
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 PF 12-JAN-1990; 90CA-02007699.
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 PR 12-JAN-1990; 90CA-02007699.
 PR 01-MAR-1990; 90CA-02011253.
 PR 10-JUL-1990; 90CA-02020817.
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 PA (HSCR-) HSC RES DEV CORP.
 XX
 PI Tsui LC, Rommens JM, Kerem B;
 XX
 DR WPI; 1991-238022/32.
 DR N-PSDB; AAQ13072.
 XX
 PT Mutant cystic fibrosis trans-membrane conductance regulator gene - used
 PT for producing prods. for diagnosis, screening and therapy of cystic
 PT fibrosis.
 XX
 PS Claim 20; Page 124; 178pp; English.
 XX
 CC 3659 del C is a frameshift mutation in exon 19. The 3659 del C mutation
 CC results in a shortened polypeptide significantly different from the
 CC single amino acid deletions or alterations. The mutant CF gene when
 CC expressed in cells of the human body, is associated with altered cell
 CC function which correlates with the genetic disease cystic fibrosis. See
 CC also AAQ13053-72
 XX
 SQ Sequence 1190 AA;

 Query Match 100.0%; Score 33; DB 2; Length 1190;
 Best Local Similarity 100.0%; Pred. No. 2.3e+02;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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551 GQRARIS 557

SUMMARIES

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2	33	100.0	110	3	US-08-469-617-18	Sequence 18, Appl
3	33	100.0	110	4	US-08-469-630-18	Sequence 18, Appl
4	33	100.0	150	4	US-09-647-140B-25	Sequence 25, Appl
5	33	100.0	309	1	US-08-463-092B-8	Sequence 8, Appli
6	33	100.0	309	2	US-08-460-907B-8	Sequence 8, Appli
7	33	100.0	836	1	US-08-216-971-2	Sequence 2, Appli
8	33	100.0	836	2	US-08-812-979-2	Sequence 2, Appli
9	33	100.0	1476	3	US-09-256-703-2	Sequence 2, Appli
10	33	100.0	1479	2	US-08-951-912-4	Sequence 4, Appli
11	33	100.0	1479	3	US-09-174-077-4	Sequence 4, Appli
12	33	100.0	1480	1	US-07-637-621-2	Sequence 2, Appli
13	33	100.0	1480	1	US-08-136-742A-2	Sequence 2, Appli
14	33	100.0	1480	1	US-08-135-809A-2	Sequence 2, Appli
15	33	100.0	1480	1	US-08-466-886-17	Sequence 17, Appl
16	33	100.0	1480	2	US-08-951-912-2	Sequence 2, Appli
17	33	100.0	1480	2	US-08-469-461-2	Sequence 2, Appli
18	33	100.0	1480	2	US-08-469-461-4	Sequence 4, Appli
19	33	100.0	1480	2	US-08-691-605-2	Sequence 2, Appli
20	33	100.0	1480	2	US-08-455-552A-14	Sequence 14, Appl
21	33	100.0	1480	3	US-07-890-609-2	Sequence 2, Appli
22	33	100.0	1480	3	US-07-890-609-4	Sequence 4, Appli
23	33	100.0	1480	3	US-09-248-026-2	Sequence 2, Appli
24	33	100.0	1480	3	US-08-469-617-17	Sequence 17, Appl
25	33	100.0	1480	3	US-08-681-838A-2	Sequence 2, Appli
26	33	100.0	1480	3	US-08-681-838A-3	Sequence 3, Appli
27	33	100.0	1480	3	US-09-174-077-2	Sequence 2, Appli
28	33	100.0	1480	4	US-09-425-453A-2	Sequence 2, Appli
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42	30	90.9	258	4	US-09-252-991A-23325	Sequence 23325, A
43	30	90.9	348	4	US-09-270-767-33144	Sequence 33144, A
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45	30	90.9	1480	4	US-09-425-453A-10	Sequence 10, Appl

RESULT 5

US-08-463-092B-8

; Sequence 8, Application US/08463092B

; Patent No. 5766880

; GENERAL INFORMATION:

; APPLICANT: Cole, Susan P.C.

; APPLICANT: Deeley, Roger G.

; TITLE OF INVENTION: ISOLATED NUCLEIC ACID MOLECULES ENCODING

; TITLE OF INVENTION: MULTIDRUG RESISTANCE PROTEINS

; NUMBER OF SEQUENCES: 9

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: PARTEQ RESEARCH & DEVELOPMENT INNOVATIONS

; STREET: Queen's University at Kingston

; CITY: Kingston

; STATE: Ontario

; COUNTRY: CANADA

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; ZIP: K7L 3N6
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: ASCII text
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; APPLICATION NUMBER: US/08/463,092B
; FILING DATE: 05-JUN-1995
; CLASSIFICATION: 435
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: 07/966,923
; FILING DATE: 27-OCT-1992
; CLASSIFICATION: 435
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: 08/029,340
; FILING DATE: 8-MAR-1993
; CLASSIFICATION: 435
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: 08/141,893
; FILING DATE: 26-OCT-1993
; CLASSIFICATION: 435
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: 08/407,207
; FILING DATE: 20-MAR-1995
; CLASSIFICATION: 435
; ATTORNEY/AGENT INFORMATION:
; NAME: Steeg, Carol Miernicki
; REGISTRATION NUMBER: 39,539
; REFERENCE/DOCKET NUMBER: Q1546
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (613) 545-2342
; TELEFAX: (613) 545-6853
; INFORMATION FOR SEQ ID NO: 8:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 309 amino acids
; TYPE: amino acid
; TOPOLOGY: linear
; MOLECULE TYPE: peptide
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US-08-463-092B-8

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Db      111 GQRARIS 117

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RESULT 7
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; Sequence 2, Application US/08216971
; Patent No. 5639661
; GENERAL INFORMATION:
; APPLICANT: Welsh, Michael J.
; APPLICANT: Sheppard, David N.
; TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING
; TITLE OF INVENTION: CYSTIC FIBROSIS
; NUMBER OF SEQUENCES: 2
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: LAHIVE & COCKFIELD
; STREET: 60 State Street, suite #510
; CITY: Boston
; STATE: Massachusetts
; COUNTRY: USA
; ZIP: 02109-1875
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk

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;      COMPUTER:  IBM PC compatible
;      OPERATING SYSTEM:  PC-DOS/MS-DOS
;      SOFTWARE:  PatentIn Release #1.0, Version #1.25
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;      APPLICATION NUMBER:  US/08/216,971
;      FILING DATE:  23-MAR-1994
;      CLASSIFICATION:  514
;      ATTORNEY/AGENT INFORMATION:
;      NAME:  Arnold, Beth E.
;      REGISTRATION NUMBER:  35,430
;      REFERENCE/DOCKET NUMBER:  UIZ-011
;      TELECOMMUNICATION INFORMATION:
;      TELEPHONE:  (617) 227-7400
;      TELEFAX:  (617) 227-5941
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;      SEQUENCE CHARACTERISTICS:
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;      TYPE:  amino acid
;      TOPOLOGY:  linear
;      MOLECULE TYPE:  protein
US-08-216-971-2

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SEQ ID NO: 4

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ID AAR79835 standard; protein; 836 AA.

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AC AAR79835;

XX

DT 25-MAR-2003 (revised)

DT 02-MAY-1996 (first entry)

XX

DE Truncated cystic fibrosis transmembrane conductance regulator.

XX

KW Cystic fibrosis; transmembrane conductance; N-terminal; soluble;

KW truncated; chloride ion channel; gene therapy; CFTR; regulator;

KW epithelial cells; anion; recombinant production.

XX

OS Homo sapiens.

XX

PN W09525796-A1.

XX

PD 28-SEP-1995.

XX

PF 23-MAR-1995; 95WO-US003680.

XX

PR 23-MAR-1994; 94US-00216971.

XX

PA (IOWA) UNIV IOWA STATE RES FOUND INC.

XX

PI Welsh MJ, Sheppard DM;

XX

DR WPI; 1995-344617/44.

DR N-PSDB; AAT04005.

XX

PT New truncated CFTR polypeptide - functions as a regulated epithelial cell

PT anion channel, used for treating cystic fibrosis.

XX

PS Claim 17; Page 70-73; 85pp; English.

XX

CC AAT04005 encodes AAR79835 a truncated N-terminal portion of the cystic
 CC fibrosis transmembrane conductance regulator (CFTR), which can be used to
 CC regulate the opening and closing of epithelial cell anion (chloride ion)
 CC channels. The truncated cDNA is useful in CF gene therapy, as it is more
 CC readily accommodated by available gene therapy vectors, and more easily
 CC expressed than full length CFTR. The expressed truncated CFTR protein may
 CC be more soluble and therefore more readily purified from host cells,
 CC useful in the recombinant prodn. of CFTR. (Updated on 25-MAR-2003 to
 CC correct PI field.)

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SQ Sequence 836 AA;

Query Match 100.0%; Score 33; DB 2; Length 836;

Best Local Similarity 100.0%; Pred. No. 2.6e+02;

Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Db

762 QARRRQS 768

RESULT 7

AAR13303

ID AAR13303 standard; protein; 1091 AA.

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AC AAR13303;

XX

DT 14-OCT-1991 (first entry)

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DE CFTR Y1092X.

XX

KW Deletion; mutant; diagnosis; antibodies; drug therapy.

XX

OS Homo sapiens.

XX

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 PF 12-JAN-1990; 90CA-02007699.
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 PR 12-JAN-1990; 90CA-02007699.
 PR 01-MAR-1990; 90CA-02011253.
 PR 10-JUL-1990; 90CA-02020817.
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 PA (HSCR-) HSC RES DEV CORP.
 XX
 PI Tsui LC, Rommens JM, Kerem B;
 XX
 DR WPI; 1991-238022/32.
 DR N-PSDB; AAQ13066.
 XX
 PT Mutant cystic fibrosis trans-membrane conductance regulator gene - used
 PT for producing prods. for diagnosis, screening and therapy of cystic
 PT fibrosis.
 XX
 PS Claim 20; Page 124; 178pp; English.
 XX
 CC In the LY1092X mutation a C to A change is detected at nucleotide
 CC position 3408. This would result in protein synthesis termination at
 CC amino position 1092. Hence the amino acid Tyr is not present in the
 CC truncated polypeptide. The mutant CF gene when expressed in cells of the
 CC human body, is associated with altered cell function which correlates
 CC with the genetic disease cystic fibrosis. See also AAQ13053-72
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 SQ Sequence 1091 AA;

Query Match 100.0%; Score 33; DB 2; Length 1091;
 Best Local Similarity 100.0%; Pred. No. 3.4e+02;
 Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 QARRRQS 7
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 Db 762 QARRRQS 768

SUMMARIES

Result	No.	Score	Query Match	Length	DB	ID	Description
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2	33	100.0	836	2	US-08-812-979-2	Sequence 2, Appli	
3	33	100.0	1476	3	US-09-256-703-2	Sequence 2, Appli	
4	33	100.0	1479	2	US-08-951-912-4	Sequence 4, Appli	
5	33	100.0	1479	3	US-09-174-077-4	Sequence 4, Appli	
6	33	100.0	1480	1	US-07-637-621-2	Sequence 2, Appli	

7	33	100.0	1480	1	US-08-136-742A-2	Sequence 2, Appli
8	33	100.0	1480	1	US-08-135-809A-2	Sequence 2, Appli
9	33	100.0	1480	1	US-08-466-886-17	Sequence 17, Appl
10	33	100.0	1480	2	US-08-951-912-2	Sequence 2, Appli
11	33	100.0	1480	2	US-08-951-912-6	Sequence 6, Appli
12	33	100.0	1480	2	US-08-469-461-2	Sequence 2, Appli
13	33	100.0	1480	2	US-08-469-461-4	Sequence 4, Appli
14	33	100.0	1480	2	US-08-691-605-2	Sequence 2, Appli
15	33	100.0	1480	2	US-08-455-552A-14	Sequence 14, Appl
16	33	100.0	1480	3	US-07-890-609-2	Sequence 2, Appli
17	33	100.0	1480	3	US-07-890-609-4	Sequence 4, Appli
18	33	100.0	1480	3	US-09-248-026-2	Sequence 2, Appli
19	33	100.0	1480	3	US-08-469-617-17	Sequence 17, Appl
20	33	100.0	1480	3	US-08-681-838A-2	Sequence 2, Appli
21	33	100.0	1480	3	US-08-681-838A-3	Sequence 3, Appli
22	33	100.0	1480	3	US-09-174-077-2	Sequence 2, Appli
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30	33	100.0	1480	4	US-09-425-453A-14	Sequence 14, Appl
31	33	100.0	1480	4	US-09-425-453A-16	Sequence 16, Appl
32	33	100.0	1480	4	US-09-425-453A-18	Sequence 18, Appl
33	33	100.0	1480	4	US-09-425-453A-20	Sequence 20, Appl
34	33	100.0	1480	4	US-08-469-630-17	Sequence 17, Appl
35	33	100.0	1480	4	US-09-949-016-5949	Sequence 5949, Ap
36	33	100.0	1480	4	US-09-405-735-2	Sequence 2, Appli
37	33	100.0	1480	5	PCT-US93-11667-2	Sequence 2, Appli
38	33	100.0	1480	6	5240846-5	Patent No. 5240846
39	33	100.0	1480	6	5240846-5	Patent No. 5240846
40	33	100.0	1501	4	US-09-949-016-11311	Sequence 11311, A
41	30	90.9	217	4	US-09-252-991A-30509	Sequence 30509, A
42	30	90.9	286	4	US-09-252-991A-22717	Sequence 22717, A
43	30	90.9	314	4	US-09-252-991A-18752	Sequence 18752, A
44	29	87.9	206	4	US-09-252-991A-31842	Sequence 31842, A
45	29	87.9	256	4	US-09-252-991A-19714	Sequence 19714, A

RESULT 1

US-08-216-971-2

```

; Sequence 2, Application US/08216971
; Patent No. 5639661
; GENERAL INFORMATION:
;   APPLICANT: Welsh, Michael J.
;   APPLICANT: Sheppard, David N.
;   TITLE OF INVENTION: NOVEL GENES AND PROTEINS FOR TREATING
;   TITLE OF INVENTION: CYSTIC FIBROSIS
;   NUMBER OF SEQUENCES: 2
;   CORRESPONDENCE ADDRESS:
;     ADDRESSEE: LAHIVE & COCKFIELD
;     STREET: 60 State Street, suite #510
;     CITY: Boston
;     STATE: Massachusetts
;     COUNTRY: USA
;     ZIP: 02109-1875
;   COMPUTER READABLE FORM:
;     MEDIUM TYPE: Floppy disk
;     COMPUTER: IBM PC compatible
;     OPERATING SYSTEM: PC-DOS/MS-DOS
;     SOFTWARE: PatentIn Release #1.0, Version #1.25
;   CURRENT APPLICATION DATA:
;     APPLICATION NUMBER: US/08/216,971
;     FILING DATE: 23-MAR-1994
;     CLASSIFICATION: 514
;   ATTORNEY/AGENT INFORMATION:
;     NAME: Arnold, Beth E.
;     REGISTRATION NUMBER: 35,430
;     REFERENCE/DOCKET NUMBER: UIZ-011

```

; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (617) 227-7400
; TELEFAX: (617) 227-5941
; INFORMATION FOR SEQ ID NO: 2:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 836 amino acids
; TYPE: amino acid
; TOPOLOGY: linear
; MOLECULE TYPE: protein
US-08-216-971-2

Query Match 100.0%; Score 33; DB 1; Length 836;
Best Local Similarity 100.0%; Pred. No. 67;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 QARRRQS 7
|||
Db 762 QARRRQS 768

RESULT 6

US-07-637-621-2

; Sequence 2, Application US/07637621
; Patent No. 5407796
; GENERAL INFORMATION:
; APPLICANT: cutting, gary
; APPLICANT: antonarakis, stylianos e
; APPLICANT: kazazian jr., haig h
; TITLE OF INVENTION: CYSTIC FIBROSIS MUTATION CLUSTER
; NUMBER OF SEQUENCES: 4
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Banner, Birch, McKie and Beckett
; STREET: 1001 G Street, N.W.
; CITY: Washington, D.C.
; COUNTRY: USA
; ZIP: 20001
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/07/637,621
; FILING DATE: 19910104
; CLASSIFICATION: 435
; ATTORNEY/AGENT INFORMATION:
; NAME: kagan, sarah a
; REGISTRATION NUMBER: 32,141
; REFERENCE/DOCKET NUMBER: 1107.030010
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: 202-508-9100
; TELEFAX: 202-508-9100
; INFORMATION FOR SEQ ID NO: 2:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 1480 amino acids
; TYPE: AMINO ACID
; TOPOLOGY: linear
; MOLECULE TYPE: protein
; ORIGINAL SOURCE:
; ORGANISM: HOMO SAPIENS
US-07-637-621-2

Query Match 100.0%; Score 33; DB 1; Length 1480;
Best Local Similarity 100.0%; Pred. No. 1.2e+02;
Matches 7; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 QARRRQS 7
|||
Db 762 QARRRQS 768